5

10

15

## Abstract

A digital filtering system for filtering sample data includes a delay network for delaying input sample data to provide multiple delayed sample data outputs. The filtering system also includes a filter network represented by a decomposed coefficient weighting matrix for processing the delayed sample data outputs. A processor produces a filtered output by computing a weighted product summation of the delayed sample data outputs and the coefficient weighting matrix. The decomposed coefficient weighting matrix is derived by factoring a first coefficient weighting matrix with a common row factor and/or sparse matrix or by factoring based on matrix row or column symmetry.